

THE CITY UNBURNABLE



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The Fire Insurance Underwriters' Laboratory, Chicago

A Standard for Safe Construction

A Model of Safety From Fire

"The NATIONAL FIREPROOFING COMPANY'S methods and materials were DEMANDED and used for the construction of the Fire Insurance Underwriters' Laboratories."

"The men who DEMANDED these methods and materials are in charge of the Fire Insurance Underwriters' Laboratories and make it their sole business to know what the best fireproof methods and materials are."

The City Unburnable

and the building on which
it can be modeled



The National Fireproofing Co.

OFFICES: PITTSBURGH, NEW YORK, BOSTON,
PHILADELPHIA, BALTIMORE, CHICAGO, CANTON,
CLEVELAND, MINNEAPOLIS, LONDON.

I N T R O D U C T O R Y

Can you imagine a city in which the buildings could not burn? Do you realize that it is not only possible but practical to build such a city? Can you figure the taxes which the people of such a community would save, not merely in insurance, but in fire-extinguishing equipment and labor, in the maintenance of elaborate systems of high water pressure? Now a city is simply an aggregation of streets, alleys, railways and buildings, in which and by means of which a community of persons live, work, play and conduct business.

From a practical standpoint, when we speak of a city being destroyed by fire, we mean the buildings which compose the city and the contents of those buildings; the factories, stores, hotels, theaters, apartment buildings, houses, etc., with their stocks and machinery and, moreover, their human tenants.

It is apparent, then, that to have an unburnable city—one in which the conflagration hazard could be eliminated—we must have buildings which cannot be destroyed by fire within themselves, and which are so protected, as to the exterior, that they cannot be destroyed by fires in surrounding buildings.

There is certainly not a city in this country today which is free from the conflagration hazard. More, there is not a city which is not in great peril from this danger. The city of Baltimore offers the most recent illustration of the imminence of that peril.

If it were not for the elaborate and costly fire departments sustained by large municipalities and the constant care and watchfulness of thousands of individuals, not a single one of our great cities but could be devastated by fire within twenty-four hours. And spite of all those precautions and that great expenditure, our annual fire loss has reached the ap-

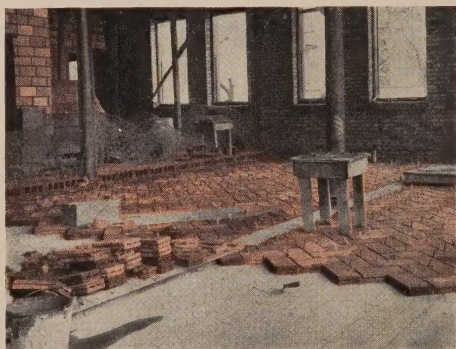


Fig. 1.
Laying Ceiling Construction. Straight centering in place and ceiling tiles being set.

palling figure of nearly seven thousand human lives and over \$230,000,000 in property. A city could be built, however, which, with one-tenth the cost for fire-extinguishing methods now in use, would be almost immune from fire and absolutely safe against any general conflagration. This is not theory, but is practical common sense.

For a hundred years the island of Cuba was scourged by the plague of yellow fever.

Our own Southern cities were contaminated and with the recurrence of every annual plague, doctors and medical supplies were poured into the plague spots until the fever was stamped out, just as our fire engines pour tons of water upon a fire.

When the cause of yellow fever was clearly discerned, its breeding spots cleaned, its mosquito haunts drained and proper sanitation installed, yellow fever practically disappeared from Cuba, and the recent visit of the fever to New Orleans can but be charged to the negligence of the people of that city in not maintaining the proper methods of prevention that had been supplied.

There is a specific law of nature which, when broken, is like every other law, broken through ignorance or temporary self-interest. But no matter from what cause it is broken it inevitably brings its punishment. That law is this:

"From the very start do things right."

The observance of this law will build the unburnable city.

Let us assume that an entire municipality is totally destroyed by fire, nothing left but wreckage and the land where the city stood.

Let us suppose that the people, through the proper legal channels, determine by law that in building their city they will build so that such a disaster can never again occur.

They pass a law that no building shall be erected that is not proof against fire, both

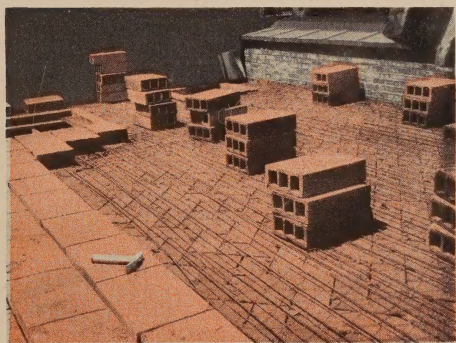


Fig. 2.
Laying Floor Construction. Tension for brick laid over ceiling tiles, and structural tiles partly set.

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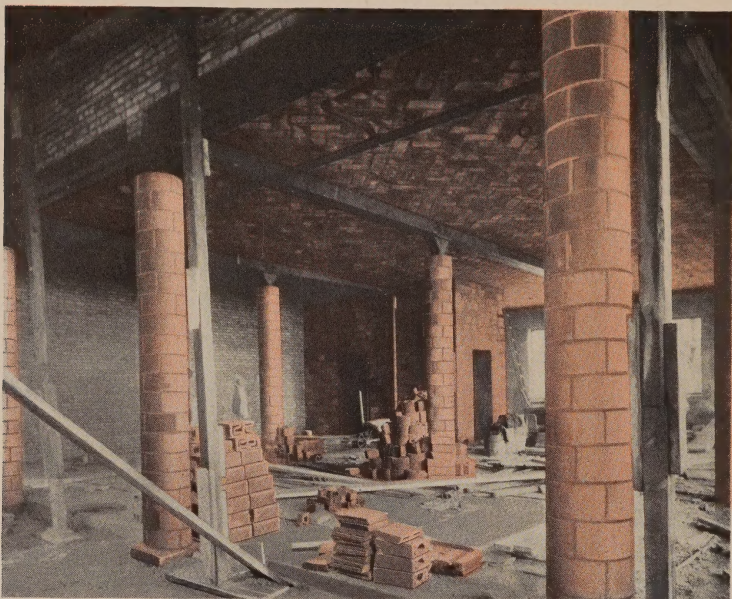


Fig. 3.
New Underwriters' Laboratories, Chicago. View in first story during construction.

from within and without. They say, in effect: "There is no need, with the present knowledge of building methods, to erect buildings that can burn. We will shut out all possibility of a conflagration in our city."

Neither is there any need of the people attempting to devise some new and extraordinary construction—they have but to look about them and they will find that the Insurance Companies have already provided the model in their Fire Insurance Underwriters' Laboratory in Chicago.

A city of buildings, every one different in its appearance, its uses and its size, could be built of perfectly fireproof construction by following the methods of design and materials used in this model building and such a city would be certain of absolute safety from fire.

The buildings could be filled with the average class of contents necessary for the use and supply of a community and still not only would the buildings be proof against fire, but so would the vast bulk of goods contained in them.



Fig. 4.
New Underwriters' Laboratories, Chicago. View in second story. Men pointing joists in ceiling.

The basic fireproof principle of complete isolation as exemplified in the design of this model building would make it impossible for any large portion of the contents of any building to be burned. Any fire would be certain to be held in the individual apartment or floor in which it started and even if it were simply allowed to burn itself out without any attempt at extinguishing it, the contents of the other floors and apartments would be safe.

Now, to secure all this advantage of safety to property and life, savings on fire-extinguishing equipments, etc., what would the community have to do? It is another law of nature that we cannot get something for nothing. That for each advantage secured there must be a recompense.

The community, to build an unburnable city, would have to make an original investment of about ten per cent more than they would invest for ordinary buildings.

For this insignificant additional sum the city would be recompensed, not alone by the additional safety, but many fold by a direct

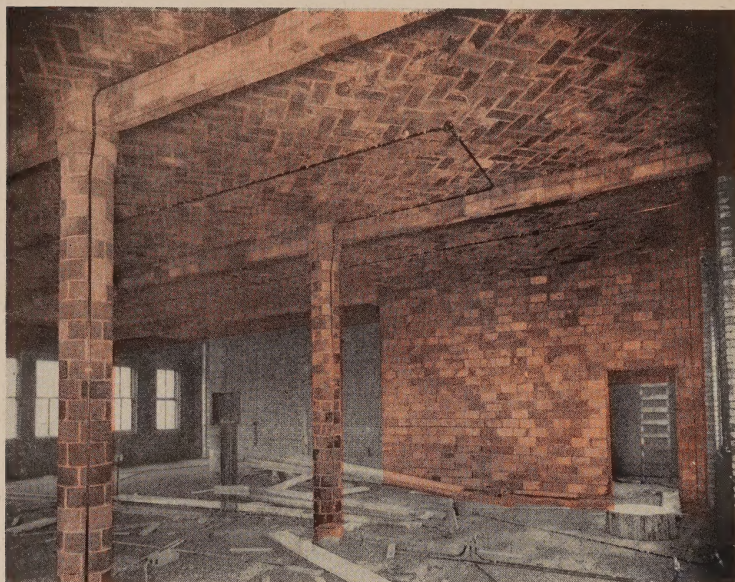


Fig. 5.
New Underwriters' Laboratories, Chicago. View in third story. Joints pointed.

saving in taxes for fire department, etc., to say nothing of the tremendous saving to owners and tenants of buildings in lessened fire losses and reduced insurance premiums.

The question of insurance premiums brings us back again to the model fireproof building.

Rates for fire insurance are based on the degree of risk from destruction by fire on the property insured.

The Fire Insurance Underwriters who make these rates must know what constitutes a safe risk; what makes a fireproof building.

So great did the demand among insurance interests become for definite and accurate knowledge of these points that several years ago the Fire Insurance Underwriters' Association established a bureau of investigation known as the Fire Insurance Underwriters' Laboratories whose officers' sole business is to study, test, investigate and report the degree of efficiency and safety of the various materials and methods which are claimed to make buildings immune against fire.

Gradually the work of this institution has become recognized as

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so valuable and of so wide a scope that it was decided to erect a special building in Chicago in which the work would be carried on.

It was decided that this building should be a perfect model of safety from fire, the highest standard for safe construction.

The National Fire-Proofing Company's methods and materials were demanded and used for the construction of this building. And the men in charge of the Fire Insurance Underwriters' Laboratories who demanded these methods and material make it their sole business to know what the best methods and materials are.

The building was to be only three stories in height, with a basement, and hence steel skeleton construction was not necessary. So it was decided that the exterior walls should be of the best hard-burned brick, inside and outside; that protected cast-iron columns should be used to support steel girders and beams for the floor and roof, the latter, of course, protected; that there should be no attic, but that the ceiling of the third story should be the roof; that all floor and roof construction partitions, column and beam protection should be of semiporous hollow terra cotta with thick walls, and that all openings in the hollow tile partitions should be framed with rolled channel steel framed together, which should be the final finish around the same. It was also decided that there should be no plastering in the building and that all the floors should be finished with cement. Furthermore, that all window frames, skylights and sash should be of sheet metal which has been tested in the laboratory and that all glass should be wired. All doors also should be of double copper or steel and filled, and in fact, that no combustible material should enter into the finish or furnishing of the building.

For floor construction it was decided to use the Johnson tension system. But instead of using it with cement ceilings, the ceilings are all of 2-inch porous tiles. These tiles are set directly on the straight board centering, in herringbone fashion, and form the finished ceiling. The method of setting them is shown in Fig. 1. In Fig. 8 they are shown with grooves in the edges. Between these grooves metallic clips are set, which are secured to the tension material of steel wire fabric, before the coat of cement is spread. The tension material covers each floor from wall to wall, bearing on the girders where it crosses them. A thick coat of cement completely embeds the steel fabric and in this are laid the 5 by 12 by 18 inch hollow semiporous tiles, which are thus cemented to the ceiling tiles (see Fig. 2). The

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five-inch tiles are in compression in this construction. The ceiling tiles in combination with them are part of the original Johnson invention. They have no hollow spaces and would have to be destroyed before the floor construction could in any way be affected by fire. The exposed joints in the ceiling tiles were raked out after the centering was struck, as shown in Fig. 4, and then carefully pointed.

All the floors were covered with a rough coat of cement which filled the vertical joints between the 5-inch tiles, and afterward finished with a smooth coat of cement. The roof was finished with felt and gravel over this.

The detail drawing of the steel and fireproof work, shown in Fig. 8, is so graphic as hardly to need further explanation. It is worthy of careful study by all who desire to introduce the most thorough and perfect protection in buildings constructed with iron and steel. In Fig. 9 is seen a plan and section of the stairway extending from first to third story. The landings are constructed in the same manner as the floors.

The steps are each in a single piece of hollow terra cotta made by forcing the clay through a die in the same manner as fireproof tiles. The steps have molded nosings, are of smooth finish and the tops and bottoms are equally prominent after setting. Each stairway is four feet wide in the clear. On the outer or wall side the steps are built into the pressed brick facing of the wall, and in the center between the flights they are built

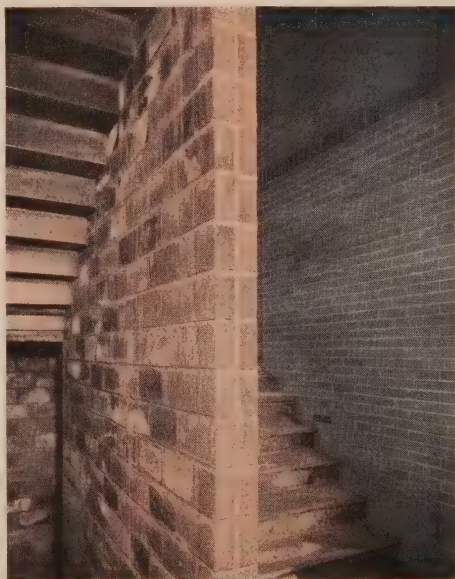


Fig. 6.
The Hollow Tile Stairway and Supporting Partition.

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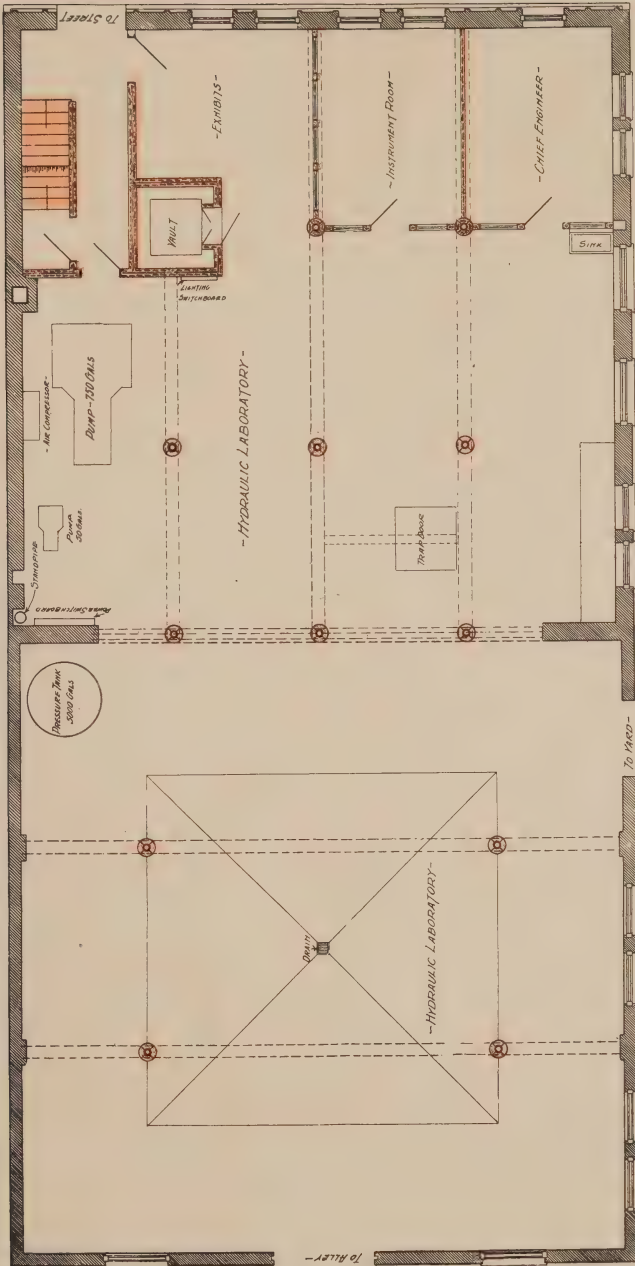


Fig. 7.
Ground Floor of Underwriters' Laboratory.

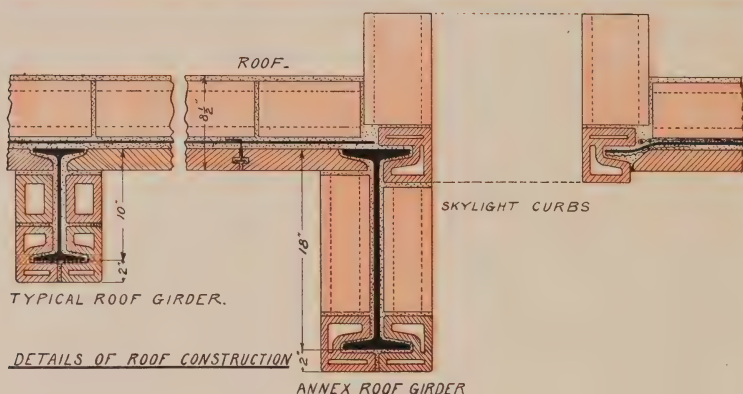


Fig. 8.

into double partitions of hollow tile, so that there are no balustrades or railings. A picture of part of a completed stairway is seen in Fig. 6. All joints in the hollow tile work on stairway and wherever exposed were carefully raked out and pointed after this picture was taken. The brick walls on all stairways are faced with hard red pressed bricks. The same face bricks are used on the brick walls of the second story, the whole of which is used for office purposes.

Attention is directed to Figs. 7 and 11, where it will be seen that the partitions around the stairway and vault are all double. They are

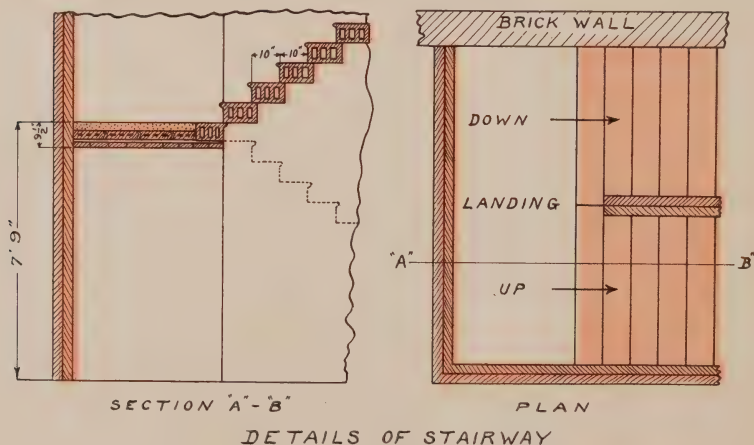
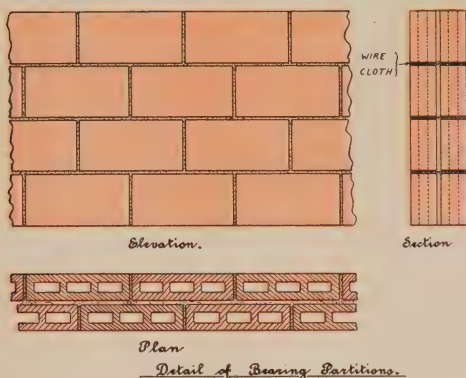


Fig. 9.

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built with two thicknesses of 3-inch hollow semiporous tiles, which makes them 6½ inches thick. Thus they are built to a line on both sides. It will be seen that the vault partition running from basement to roof carries the double I-beam girder on each story.

building is faced with paving brick of a dark color and showing the effects of vitrification. Bright red bricks are used in the front which produce an admirable effect of contrast, and this is heightened by a judicious use of hand-molded terra cotta in bright red and chocolate tints.

Other interesting details of the work will be seen by reference to

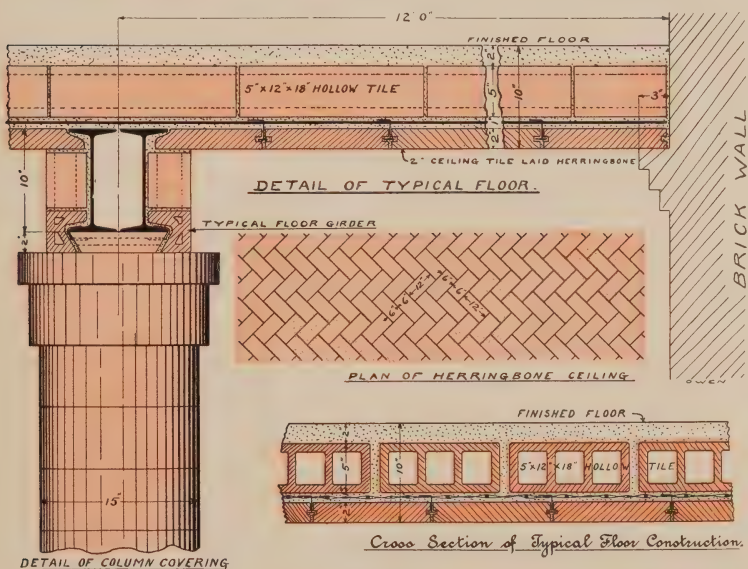


Fig. 10.

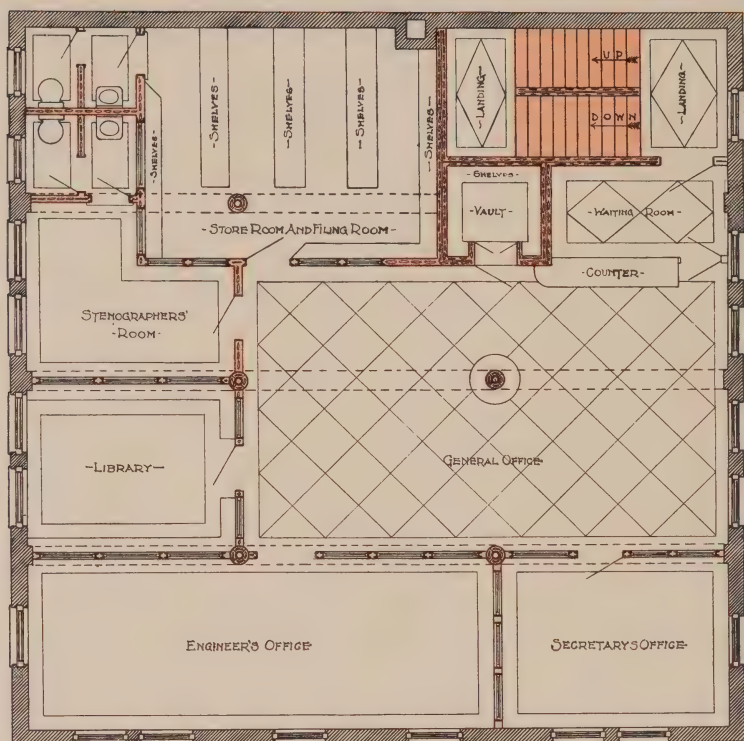


Fig. 11.
Second Floor Plan of the Underwriters' Laboratory Building.
Argyle E. Robinson, Architect, 623-84 La Salle Street, Chicago.

the illustrations herewith. Fig. 7 is a general ground plan of the first story, of which the rear extension is only one story high. Here tests are made with sprinklers, acetylene generators, etc. The open yard on the east covers the same area as the building. Here will be located the huts for fire tests, provided with connections for using city gas.

Figure 11 shows a plan of the second story, which is used entirely for business offices and contains a vault with double door. In this story may be seen the construction of 4-inch hollow tile partitions, in which are numerous doors and windows which serve as models for imitation in all office buildings.

In Figure 3 may be seen the setting of the protection to the steel work, which has been only partially completed. The view is taken from the one-story extension looking toward the front.

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The following information about the objects, uses and administration of the Underwriters' Laboratories has been furnished by W. H. Merrill, Jr., the secretary:

"These laboratories are under the direction of the National Board of Fire Underwriters. They are supported by the stock fire insurance companies doing business in the United States, are engaged exclusively in experimental work in fire protection engineering and testing of devices and materials having a bearing on the fire hazard. This plant is the only thing of the kind in the world and has grown to its present size and importance from a beginning made ten years ago in the establishment by the Western Insurance Union and the Chicago Underwriters' Association of a small room for testing electrical fittings on the second floor of one of the insurance patrol houses in Chicago.

"The present officers and staff of the Laboratories are: President of the corporation and chairman of the board, Henry Clay Eddy of Chicago, resident secretary Commercial Union and Palatine Insurance Companies.

"Secretary of the Corporation—W. H. Merrill, Jr.

"The Engineering Staff—William C. Robinson, chief engineer; Prof. Fitzhugh Taylor, hydraulics; H. W. Foster, chemicals, gases and oils; Arthur M. Paddon, electricity.

"This organization, upon the efficiency of which the insurance interests largely depend for correct estimates of the value of fire extinguishing appliances and fire resistive materials and methods of construction, as well as for correct methods of safeguarding as far as practicable lighting and heating devices, has enjoyed up to the present time the cordial support and co-operation of the manufacturing companies interested in the construction of wares of this character, and as it retains in its new home the staff and governing boards which have been principally responsible in its upbuilding it is expected to continue its progress and become in the future even more of an important factor for the general good of legitimate manufacturing enterprises, insurance companies and the insuring public."



The National Fireproofing Company,

Engineers and Contractors
for Construction of

FIREPROOF BUILDINGS.

The training and experience of our Engineers enable us to suggest more economical combinations of Steel and Hollow Tile construction than can possibly be secured by those who have not had this experience in the *combined* use of the two materials. If you are an architect preparing plans for a fireproof building or if you are the owner of the prospective building

Our Engineers are at your service.

Time and money can be saved if you will talk to us in the early stages of the planning of your building (in fact before the plans are drawn).

Write us at any of our offices:

The National Fireproofing Company,

PITTSBURGH, PA., Bessemer Building.

CHICAGO, ILL., Hartford Building.

NEW YORK, 170 Broadway.

BOSTON, MASS., Old South Building.

PHILADELPHIA, Land Title Building.

WASHINGTON, D. C., Colorado Building.

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